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Development of Polymeric charge storage electrets for microelectronics applications

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Polyvinyl carbazole (PVK) is a polar polymer that exhibits excellent chemical resistance and good mechanical properties. Inspite of its activeness for many applications, the various mechanisms are presently not well understood. In the present work, we have attempted to identify the nature of the thermally stimulated discharge currents in pure and malachite green doped polyvinyl carbazole (PVK) samples by comparing the observed dependence on parameters such as electric field, polarization temperature, time and dopant between the charge and discharge currents. The thermally stimulated discharge current (TSC) and Fourier transform infrared spectroscopy (*FTIR)* have been recorded in 50 μm thick samples of pure and malachite green doped PVK samples. The study has been carried out by TSDC patterns of electrets formed by polarization method in the range of 300 to 900 volts field strengths at 45°C to 75°C with constant heating rates. The samples of pure and malachite green doped PVK were prepared in the laboratory by solution cast technique. The various results described in short circuit TSDC has indicated that the electrets state in pure and malachite green doped PVK samples is due to dipole polarization and space charge polarization. The results on pure and malachite green doped PVK samples by FTIR and TSDC we have concluded that impregnation of malachite green in polymer matrix forms charge transfer complexes.

Keywords: TSDC, activation energy, PVK, FTIR